

研究论文

# 北京北部农牧交错区C<sub>4</sub>植物及其形态功能型和生境分析

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收稿日期 2006-3-10 修回日期 2006-4-25 网络版发布日期: 2006-5-25

**摘要** 根据野外调查和文献资料研究了北京北部农牧交错区C<sub>4</sub>植物的种类组成、形态功能型组成及其与生境的关系。该区共有野生C<sub>4</sub>植物68种,分布在7科,40个属,其中禾本科43种,莎草科16种,藜科5种。1年生(ANG和 AN F)C<sub>4</sub>物种占C<sub>4</sub>植物总数的62%,它们在盐碱地、沙地、弃耕干扰地、湿地均超过这些生境C<sub>4</sub>植物分布的半数,在草地ANG和 AN F超过30%; C<sub>4</sub>植物数量和C<sub>4</sub>/total在该地区的生境分布中有两个方向的变化:一是从草地到弃耕干扰地,两者均呈增加趋势,二是从草地到沙地和盐碱地呈现前者减少而后者增加的不同变化趋势,体现了农牧交错区植被退化的复杂性

**关键词** [C<sub>4</sub>植物](#); [C<sub>4</sub>/total](#); [农牧交错区](#); [形态功能型](#)

**分类号** [Q143](#), [Q948](#)

## Analysis of C<sub>4</sub> plants in term of habitats and morphological functional types in agro-pastoral ecotone North to the Beijing, China

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**Abstract** More than 1700 C<sub>4</sub> plant species have been identified over the world wide since the work of Downton and Tregunna (1968). Most of these studies focused on the classification of plant species as to their photosynthetic pathway types (C<sub>3</sub>, C<sub>4</sub> and CAM), geographic distribution of C<sub>4</sub> plants and their relationships with climatic patterns. But very few have examined the relations between C<sub>4</sub> species and vegetation dynamics, especially in agro-pastoral ecotones. By dint of morphological functional types, C<sub>4</sub> plants and their relations with habitats in agro-pastoral ecotone North to the Beijing were analyzed based on field survey and references. Of the total identified 733 species in 304 genera and 66 families, only 64 species in 40 genera and 7 families were found with C<sub>4</sub> photosynthesis. This indicated that the C<sub>4</sub> species mainly occurred in a few families in the region, but most of these species were common species and related with vegetation dynamics. Gramineae is the leading family with C<sub>4</sub> photosynthesis (43 species), Cyperaceae ranks the second (16 species), then followed by Chenopodiaceae (5 species). The significant increase of C<sub>4</sub> species in the communities with land deterioration suggested C<sub>4</sub> plants remarkably response to the land-use frequency and intensity in the ecotone. The number of C<sub>4</sub> species and proportion of C<sub>4</sub>/total increased with desertification from RL to DC. The total number of C<sub>4</sub> species dropped significantly from RL to SS and SL, while proportions of C<sub>4</sub> species increased significantly. For each morphological functional types, C<sub>4</sub> proportion in ANG was much high (64%), followed by SPG (53%), H

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PG (18%), ANF (14%), but that in SHR and PEF were much lower (less than 1%). The proportions of ANG and ANF in DC, WE, SS and SL habitats exceeded by 50% respectively, and 30% in RL, indicating that communities were not stable in this ecotone. The findings suggest that the photosynthetic pathways, combined with morphological functional types, are efficient indicators for studying the linkage between species and habitats in the region.

**Key words** C<sub>4</sub> species; C<sub>4</sub>/total; morphological functional types; agro-pastoral ecotone

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